adarad

Solidmaster -F

Cast iron boiler for solid fuel firing

Models

Solidmaster **4F**
Solidmaster **5F**
Solidmaster **6F**
Solidmaster **7F**
Solidmaster **8F**

Installation and User Manual

CE 1783

Rev.october.2010

Thank you for purchasing ADARAD Solidmaster-F boiler. Please read this manual carefully before installation and operation of your product, and keep it during the whole operation life. Do not touch or interfere any part of the product other than those allowed. The installation, maintenance and service of this boiler requires skilled technicians. For the installation of the boiler and proper room selection, installation of water circuit, chimney design, this manual and mandatory regulations must be considered.

Solidmaster-F is a cast iron sectional boiler for solid fuel firing which is constructed in three pass horizontal flue gas circulation principle. It is designed for hot water heating systems, should not be used for direct sanitary water supply.

Thanks to its cast iron body design with flexible casting technology, your boiler is quite resistant to corrosion that could be caused by low return water and flue gas temperatures respectively, and high water content of the fuel being charged. The unique three pass flue circulation principle of Solidmaster-F boiler will give higher water efficiencies among similar products in the market, as well as lower pollutants and flue gas temperatures released from the chimney. Those features will result in save in energy usage.

Solidmaster-F boiler can be used either in forced or natural water circulation systems thanks to its large waterways inside the boiler and medium sized delivery and return connections.

You can fire different solid fuels whose specifications are given further in this manual. As calorific values of solid fuel types differ from each other, The output power of the boiler will vary between a maximum and a minimum range specified.

Delivery term

Solidmaster-F boiler is delivered in two packges:
1. Boiler pack, holds cast iron body assembled and tested at the factory, fan, control panel (dismantled).
2. Accessory pack, holds sheet metal jacket, body insulation, primary air damper, cleaning brush, ash scraper, fuel poker.

Optional accessory: A safety heat exchanger kit is delivered upon special request. This kit holds an copper heat exchanger against excessive heat accumulation inside the boiler, a safety valve to activate the heating system at high water temperatures, and auxillary accessories for installation.

Whether the hydraulic circuit is open vented or pressurised, this safety heat exchanger system should be utilized within the system for meeting the regulations of related European standard for this product, as well as the safety of whole heating installation and the boiler itself.

Safety warnings

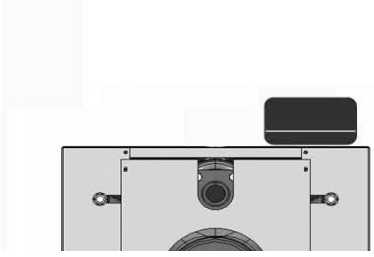
Please, follow the safety instructions before installation and operation of Solidmaster-F boiler:
* Solidmaster-F boiler must be connected to an appropriate chimney whose construction complies with the instructions given further in this manual, and mandatory regulations.The chimney must perform the requested draft values for related boiler model. Your boiler should not be fired unless the chimney connection is made, and there is enough draft for combustion.
* Always allow enough amount of fresh air in the boiler room. Refer to the instructions for room arrangement.
* Do not install the boiler in a space, shared or used by people, or in a place with direct openings to a living room.
* The boiler must be installed in an open vented hydraulic circuit unless the hydraulic circuit is equipped with safety heat exchnager kit according to the directions given further in this manual.
* Do not drain water in hydraulic circuit unless in case of maintenance or risk of freezing. 15% of anti-freezer should be added to hydraulic circuit to avoid freezing danger. In case of cast iron radiators, the hydraulic circuit should be washed
* Do not feed cold water directly to the boiler overheated by any reason. This may result in cracks on boiler sections.
* Do not fire boiler with front doors open. In case operation with fan, never open front doors without switching the fan off.
* The system design must provide water flow rates commensurate with boiler output and the temperature difference between flow and return should not exceed 20 C.
* Any irregular electricity installations in boiler room should be replaced
* Water levels should be checked regularly and any leakages corrected in order to keep system water make-up to a minimum, because excessive make-up will lead to salt deposits forming in the boiler waterways causing local overheating and damage to the boiler sections.
* The quality of water is important. The recommended hardness of water: 1-3 mol/m3 (1 mol/m3=5.6 dH), PH:8-9.5
* The boilers should be installed directly onto a smooth level floor of non-combustible material. It is recommended that the hight of the plinth should be at least 50 mm, and sized larger than the dimensions of casing of the boiler. This plinth is kept the boiler from water on the floor.
* If the boiler is going to be installed in an old heating system, the system should washed away and cleaned from any partıcules before Solidmaster-F is attached

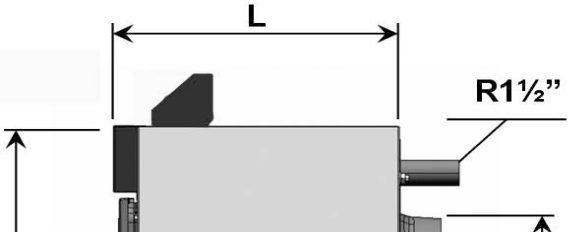
TECHNICAL DATA

Model		SM 4F	SM 5F	SM 6F	SM 7F	SM 8F
Number of sections		4	5	6	7	8
Fuels						
Output range	kW	23 - 33	30 - 42	38 - 53	48 - 65	58 - 75
Net weight	kg	245	290	340	385	430
Water content	lt	28	34	40	46	52
Combustion chember volume	cm3	51678	70389	89100	107811	126522
Fuel loading volume	cm3	31320	42660	54000	65340	76680
Max fuel loading height	cm	28				
Temperature control range	C	30 to 90				
Maximum operating temperature	C	100				
Minimum return temperature	C	50 (recommended)				
Safety system activated at	C	95				
Maximum operating pressure	bar	3				
Flue outlet diameter	mm	160				
Water flow/return connections	R	1 1/2"				
Water side resistance (dt=20 C)	mbar					
Height (H2)	mm	1070				
Width (A)	mm	520				
Length (L)	mm	470	575	680	785	890

Fuel type		Wood logs				
Output	kW	23	30	38	48	58
Efficiency	%	68	69	70	70	71
Boiler class	No	2	2	2	2	2
Maximum fuel charge	kg	20	24.5	29	33.5	38
Combustion period at max load	h	2				
Requested fuel parameters		Maximum water content 20%				
		Maximum cross section 10 cm x 10 cm				
		Average calorific value 17.000 - 20.000 kJ/kg				
Average flue gas temperature	C	235	250	265	280	300
Flue gas mass flow	g/s	13.9	18.1	22.9	28.9	34.3
Required draft at chimney	mbar	0.15-0.25	0.15-0.26	0.15-0.27	0.15-0.28	0.15-0.3
Waterside resistance for Δt=20 °K	mbar	0.51	1.03	1.81	2.92	4.63
Waterside resistance for Δt=20 °K (with safety heat exchanger)	mbar	1.36	2.50	4.18	6.53	10.14
Average content of CO to %10 O_2	mg/Nm³	2200 - 2600				

Fuel type		Hard coal				
Output	kW	33	42	53	65	75
Efficiency	%	70	70	71	71	72
Boiler class	No	2	2	2	2	2
Maximum fuel charge	kg	22	27	32	37	42
Combustion period at max load	h	4				
Requested fuel parameters		Maximum water content 15%				
		Average size between 30 to 60 mm				
		Average calorific value 26.000 - 35.000 kJ/kg				
Average flue gas temperature	C	260	275	290	305	320
Flue gas mass flow	g/s	20.8	26.9	33.8	41.5	46.5
Required draft at chimney	mbar	0.15-0.25	0.15-0.26	0.15-0.27	0.15-0.28	0.15-0.3
Waterside resistance for Δt=20 °K	mbar	0.76	1.46	2.47	3.90	5.84
Waterside resistance for Δt=20 °K (with safety heat exchanger)	mbar	1.90	3.41	5.59	8.61	12.66
Average content of CO to %10 O_2	mg/Nm³	3100 - 3800				





Handling of the product

Solidmaster-F is a heavy product, and care should be taken when carrying the boiler to the room where it is going to be installed. The total weight of each boiler is indicated in Technical data section. Carrying equipments of product must be of enough capacity to support that weight.

Room selection

Solidmaster-F boiler must be installed in an individual boiler room particularly organized for heating. The boiler room should be of enough volume for installation, firing, and maintenance of the boiler. There should be enough fresh air circulation for combustion, the chimney design must ensure an adequate draught for related boiler type, and must comply with construction criteria given further in this manual and in mandatory regulations. Your boiler must never be installed in open spaces or balconies, in spaces occupied by people like kitchen, living room, bathroom, bedroom, in spaces where there are explosive and combustible materials.

The boiler room should have air ventillation holes through outside to let fresh air in. One air ventillation hole must be built maximum 40 cm below the level of room ceiling, the other must be built maximum 50 cm above the floor level. These ventillation holes should always be kept open. The upper hole should be at least 40x40 cm in size, the lower hole at least 30x30 cm.

All hydraulic and electrical circuits must be arranged by authorized staff in accordance with mandatory regulations specified by legal organizations.

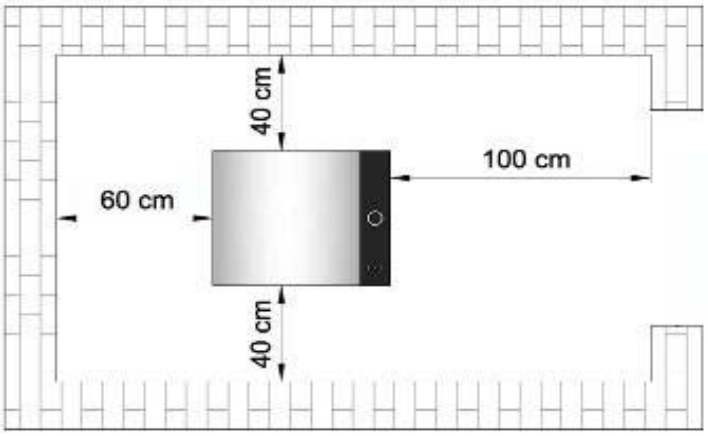
Solid fuels should be stored by keeping minimum 800 mm distance from the boiler. We recommend you to keep the solid fuel in another room.

Solidmaster-F boiler should be installed on a concrete plinth made of a fireproof material. For minimum sizes of the plinth following table should be referred

Model	SM 4F	SM 5F	SM 6F	SM 7F	SM 8F
Plinth height (mm)	50				
Plinth width (mm)	600				
Plinth length (mm)	490	595	700	805	910

Clearances around boiler

At least the following clearances should be achieved around the boiler



Circulation pump

We recommend to build a forced water circulation system accompanied with a sufficient pump. To size the pump, refer the boiler water side resistance level given in Technical data section, taking the other resistances created by the hydraulic circuit into account. Refer to the system diagrams given further in this manual to find the right position of the pump wtithin the hydraulic circuit.

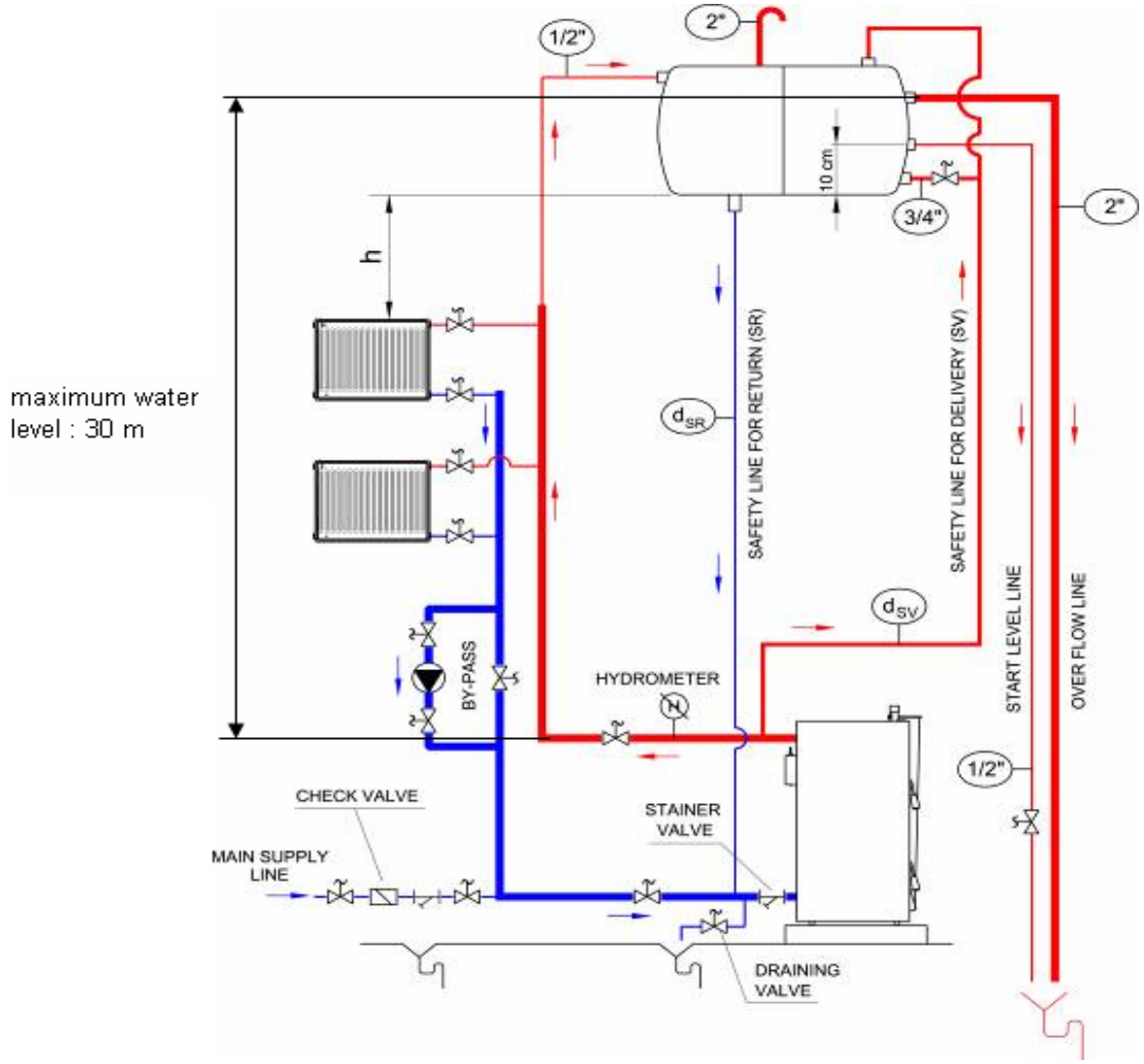
Your boiler switches the pump on and off automatically. The control panel commands to the fan and circulation pump that is why you should keep the panel switched on switched on, when the boiler temperature is above the cold water temperature or there is fuel firing inside the combustion chamber.

Never switch off the control panel when the boiler is operated to prevent excessive water temperature. Control panel has a set temperature value that can be adjust during the operating of the boiler . Control panel switch off the fan when the water temperature reach set value.

Hydraulic circuit

Open vented hydraulic circuit

Solidmaster-F boilers are preferred to be installed in a hydraulic circuit with an open type expansion tank in accordance with the following schemes. The circulation pump in the circuit should be installed on the return line to boiler in order to prevent the system from excessive thermal stresses and overheating during electricty cuts off:



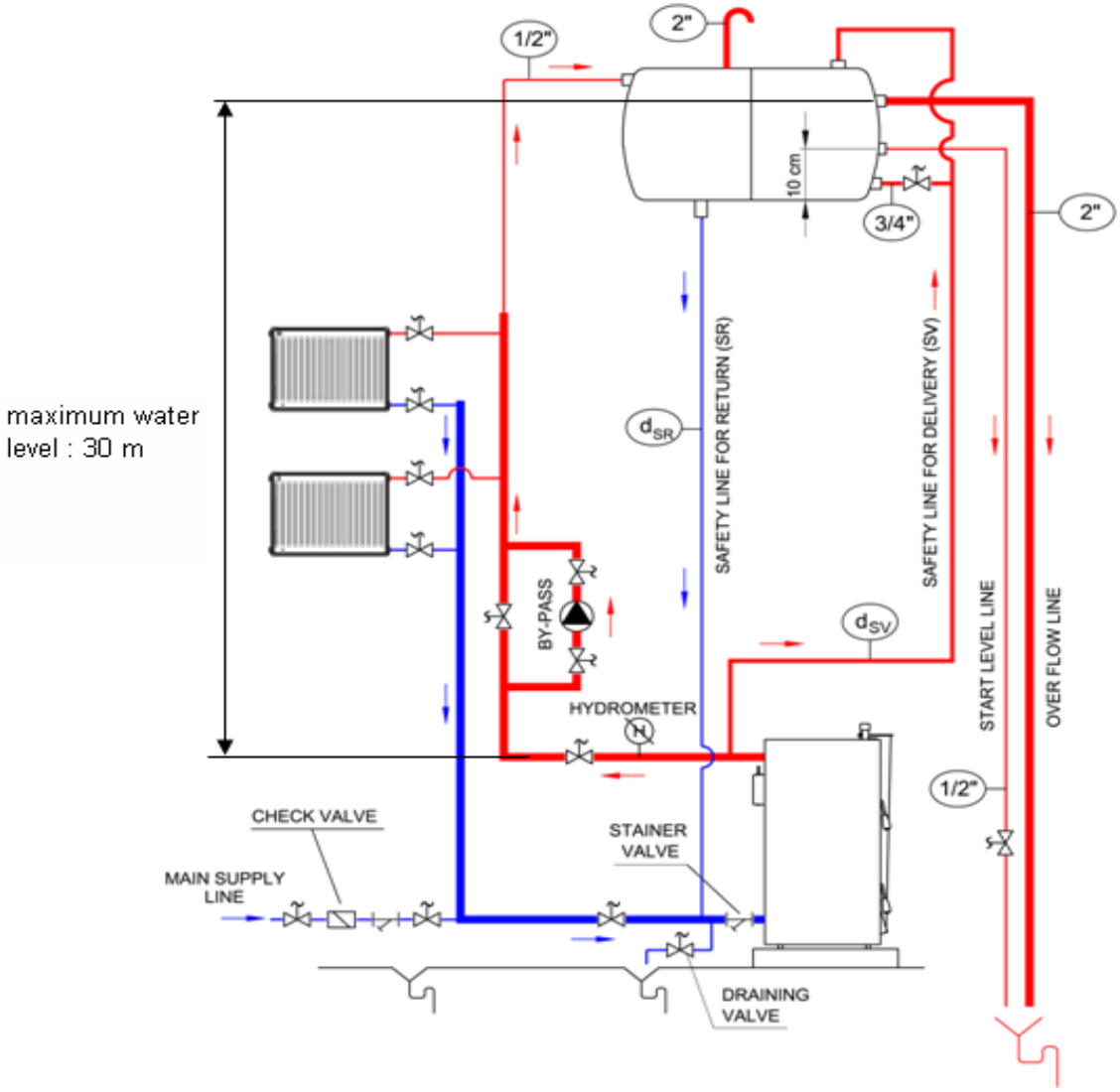
Open type expansion tank must be installed at the heighest level of whole hydraulic system. No globe valves must be installed on delivery and return safety lines between boiler and expansion tank. Safety lines should be attached to inlet and outlet lines of boiler at points as close as possible to boiler, using the shortest possible vertical way between expansion tank and boiler.

If "h" distance in above scheme can not be arranged within the construction of present system, the circulation pump must be installed on delivery line from boiler. "h" distance refers to the head pressure of circulation pump at operated speed. If "h" distance can not be arranged in a system with circulation pump on return line, there will be air suction from radiators at the highest level of system. In this case,the other scheme where pump is installed on the delivery line must be referred.

A hydrometer must be installed on the delivery line to monitor the pressure level and to check if there is any leakage. The hydrometer should be purchased separately, and should be installed at the same level with the boiler outlet.

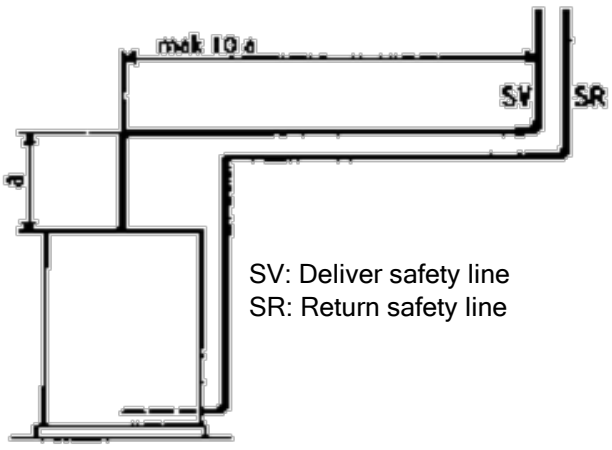
A by-pass line should be installed between inlet and outlet connections of circulation pump in order to allow maximum water delivery when circulation pump is switched off and there is fuel fired in boiler, particularly during sudden electricty cuts off.

⚠ The optional safety heat exchanger kit is highly recommended to be used with the boiler, even in the case of open vented systems to protect the boiler and the whole heating circuit against excessive heat accumulation. For installation of this kit, please refer to the next section



Design parameters for open expansion tank

Expansion tank protects the hydraulic curcuit from excessive temperatures by allowing free volume for expanding water and keeping the water pressure from exceeding the static pressure. Expansion tank may be built in rectangular prism or cylindirical shape, may be installed in horizontal or vertical position in the system. Safety lines between boiler and expansion tank should be installed by an increasing slope up to tank. Following scheme shows the maximum vertical distances between safety lines and boiler:



SV: Deliver safety line
SR: Return safety line

The size of expansion tank can easily be calculated regarding the total expanding water contained in whole system. If the total volume of water in the system is Vs; the volume of expanison tank should be:

Vg= 8.Vs / 100 (in liters)

In more practical way, just using the nominal heat output of boiler (Qk) in terms of kW, the volume of expansion tank can be caluculated as;

Vg= 2,15.Qk (in liters)

Sizing safety lines between boiler and open expansion tank

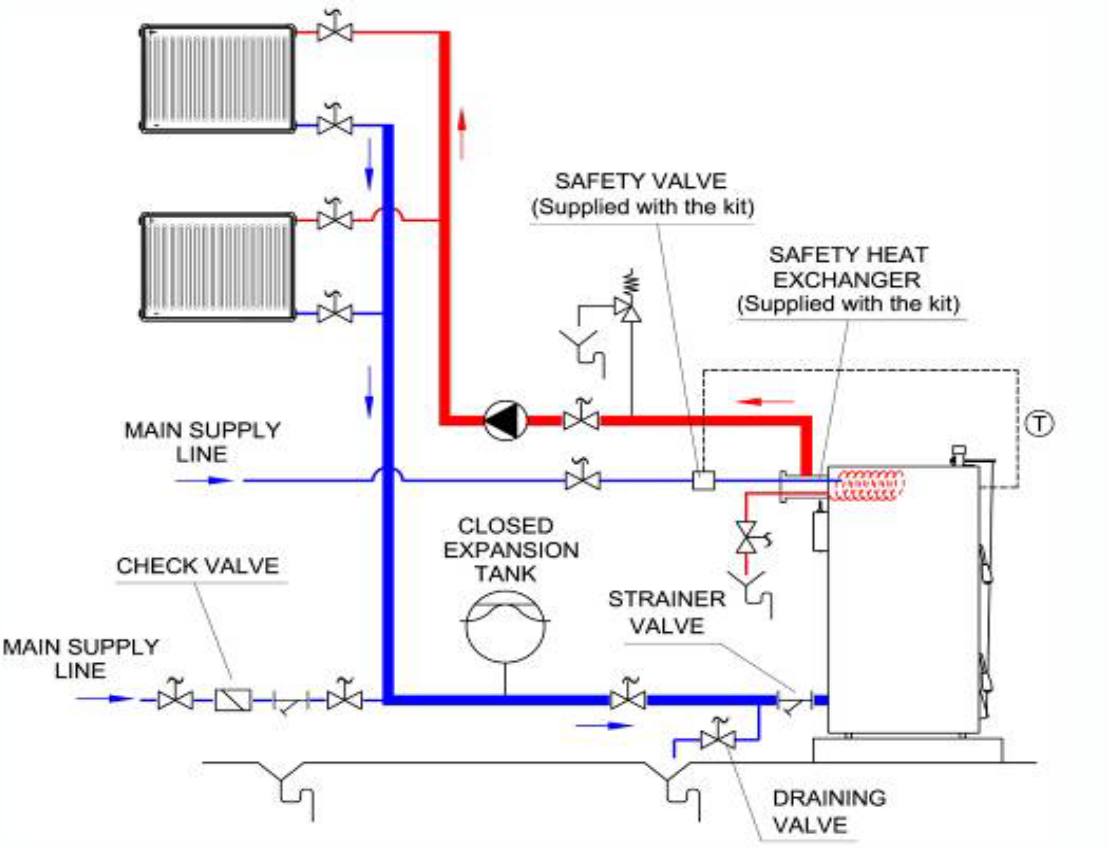
Size of the safety line for delivery $d_{SV} = 15 + 1{,}5.\sqrt{Q_k}$ (mm)

Size of the safety line for return $d_{SR} = 15 + \sqrt{Q_k}$ (mm)

where Qk is the boiler output in kW.

Pressurised hydraulic circuit

Solidmaster-F boiler can be installed in a pressurised heating system if following scheme is referred with addition of the safety heat exchanger kit which is supplied as a separate accessory.



maximum
pressure: 3 ba

Safety heat exchanger includes the following items:

1. Safety heat exchanger (copper serpantine integrated with outlet stub pipe)
2. Safety valve
3. Auxillary fittings

To install the safety heat exchanger system:

1. Remove the existing outlet stub pipe with flange of the boiler
2. Install the safety heat exchanger to the delivery port on the rear section
3. Attach the hot water delivery line to the port on top of the flanged pipe of the safety heat exchanger
4. Remove the bulb of boiler thermometer from the front section, and insert it into the pocket on the flanged pipe of the safety heat exchanger
5. Attach the safety valve on cold sanitary water line to the safety heat exchanger as shown in above scheme.
6. Insert the couple thermostat bulb of the safety valve inside the pocket on the front section of the boiler.
7. Drain the hot sanitary water outlet of the safety heat exchanger.

If the boiler water temperature exceeds 95 oC, thermostat of the safet valve lets cold sanitary water flows through the serpantine of the safety heat exchanger. Serpantine with cold water circulating inside cools down the boiler water temperature. When the boiler temperature decreases below the safe degree, safety valve shuts the cold sanitary water circulation, and the boiler goes back to normal operation.

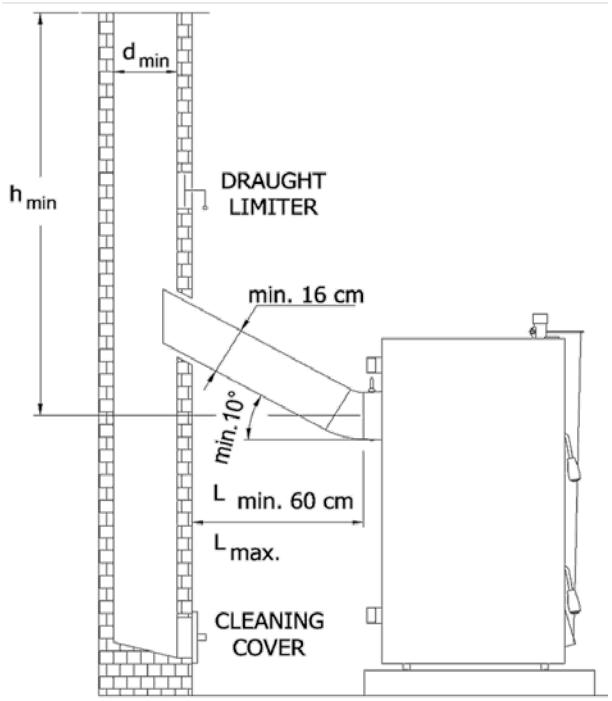
⚠ The valves on the sanitary connections of safety heat exchanger must always be kept open.

⚠ Solidmaster-F can only be used with origial safety heat exchanger kit which is tested and approved for each boiler model.

⚠ Cold water must never be delivered directly to boiler inlet in order to solve overheating porblems as this will result in serious damage on boiler body. That application will end the warranty of the boiler.

Chimney connection

Solidmaster-F boiler must be connected to an individual chimney that will provide at least the minimum draught requested. The flue canal between the boiler and the chimney should be insulated using a glass wool material. The flue canal to chimney and chimney must be made of steel or an equivalent material that can be used at temperatures around 400 C All connections on the flue system must be sealed in order to perform a good combustion and efficiency. The flue canal must be connected to the chimney using the shortest way and in accordance with the dimensions given in the following scheme. Horizontal connections and equipments that will increase the pressure loss such as elbows should be avoided

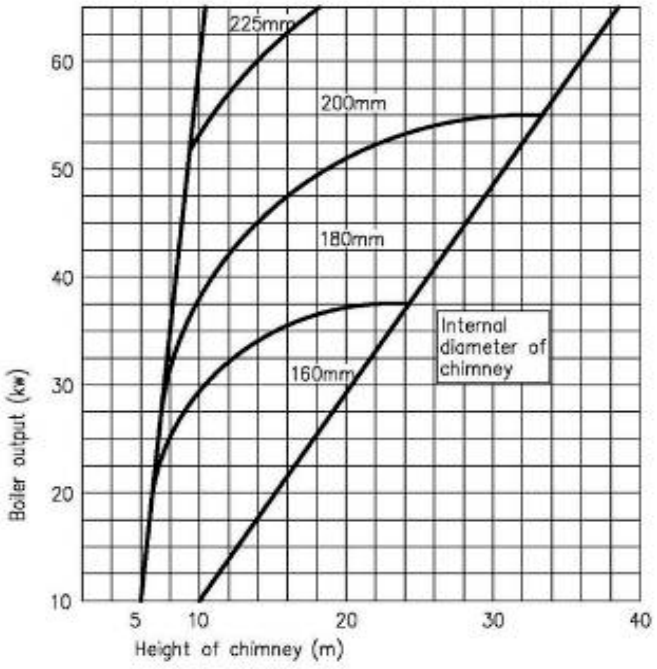


A vertical single steel piping should not be used as a chimney. Chimney must be made of one internal and one external surface. External surface may be made of steel or brick. For internal surface stainless steel chimney elements should be preferred against corrosion. The space between internal and external surfaces of the chimney should be insulated to prevent condensation in flue gasses.

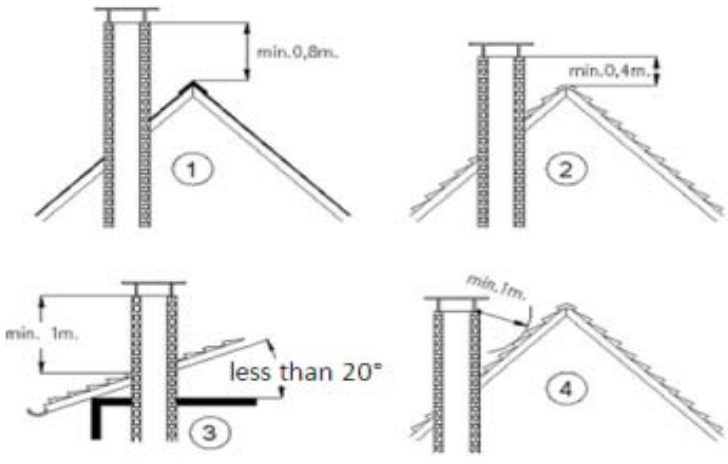
At the lowest level of chimney, there should be a cleaning cover which is made of steel, and sealed for any leakage.

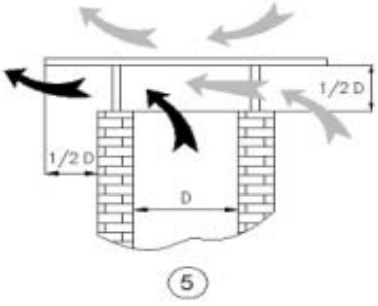
The length of flue canal between the boiler and the chimney should not exceed ¼ height of chimney.

The size of flue canal and chimney should not be less than the size of the boiler flue gas outlet connection. For the total height and the minimum internal diameter of the chimney, following diagram should be referred in respect with the boiler output power, if otherwise stated in mandatory regulations.



The heighest level of chimney outside should be in accordance with the dimensions given in following sketch so as to minimize the harmful effect of flue gasses on ambient, and to improve draught in chimney.





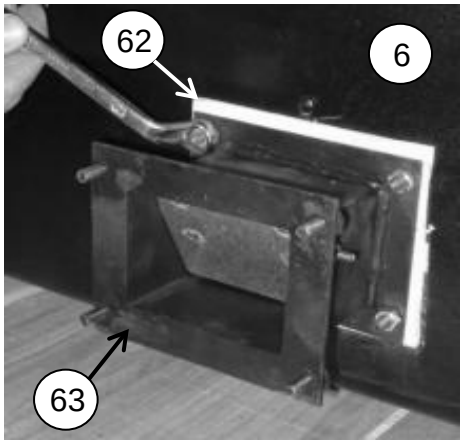
ASSEMBLY INSTRUCTIONS

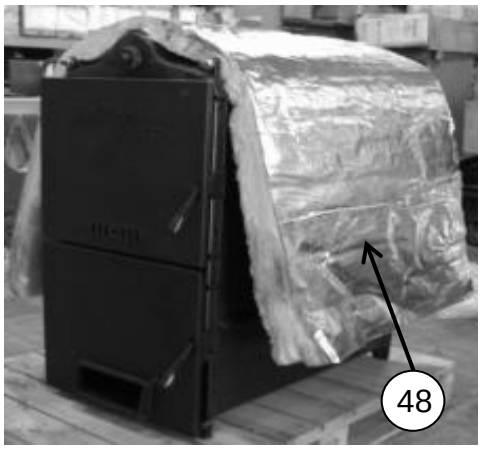
Numbers between paranthesis refer to bubble numbers in exploded drawing of the boiler that can be found at the end of this manual

Solidmaster-F boiler should be installed on a concrete plinth made of a fireproof material. We recommend you to place two pieces of steel sheetmetals underneath the front and rear elements of the boiler preferably with the dimensions H 3 mm X L 500 mm X D200 mm.

Follow the instructions to finish the assembly of boiler accessories supplied together with the boiler

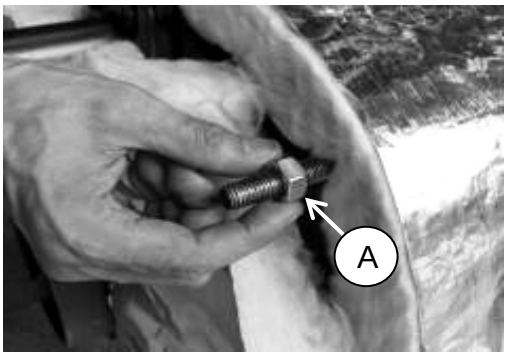
1. Fit the fan adaptor (63) onto the deep plate (6) using four pieces M6 nut (D). Place insulation material (62) between adaptor and deep plate to prevent air leakage.

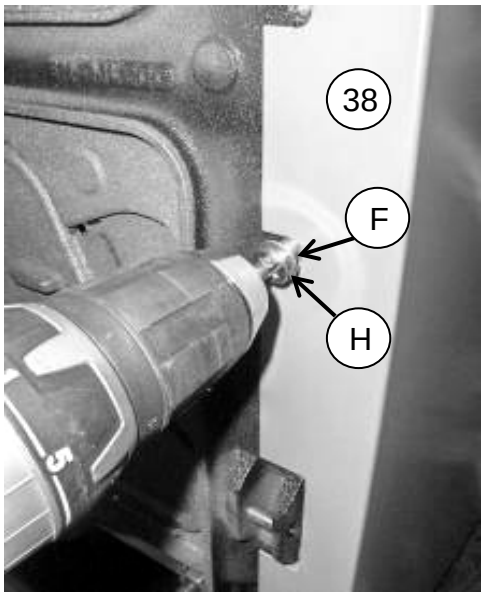




2. Place body insulation (48) squarely onto the boiler body. Place rear insulation board onto rear section as seen in the pictures above.

3. Fit four pieces of M12 nuts (A) onto free ends of the four tie rods at the rear side of the boiler as shown in the following picture. These nuts will be used to lock side panels after their assembly.

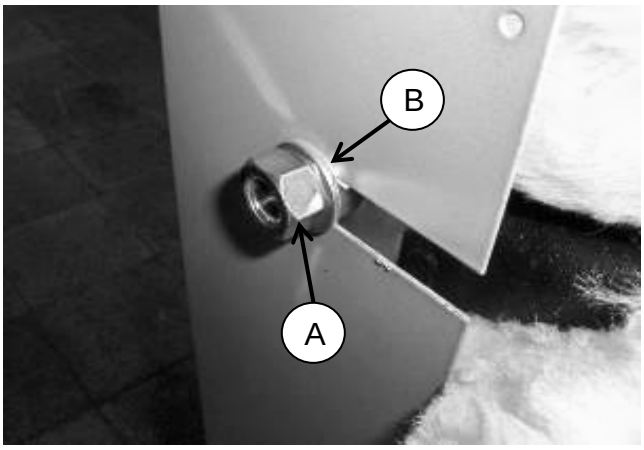


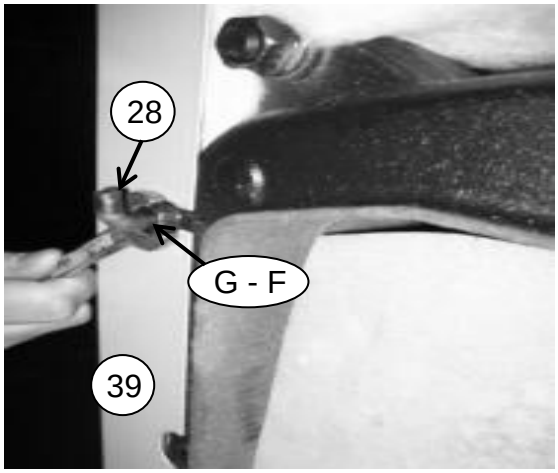


4. Fit left hand side panel (38) by passing its rear bend over upper and lower tie rods at the end. First secure the left hand side casing to the front element of the boiler by using three pieces of M8x15 fillester countersunk head bolts (H) and A8.4 flat washers (F) as shown in the pictures above.

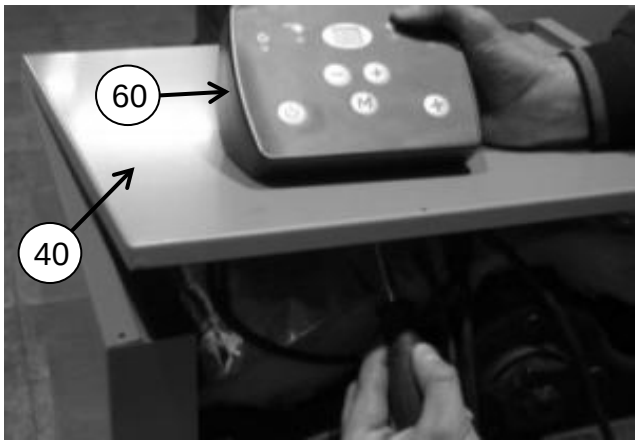
5. At the rear, secure the rear bend of left hand side panel, locking between two M12 nuts (A) and A13 flat washers (B) as shown in the following picture.

6. Likewise, fit the right hand side panel (39). When you work at the front side of the boiler, loose three M8 nuts (G) that are used to secure front door hinges (28, 29) a little, drive the front bend of the panel through the free space behind A8.4 flat washer (F). After driving the panel to right position secure it by screwing the same M8 nuts. You can set the hinges by loosing or screwing to provide that the doors are closing properly.

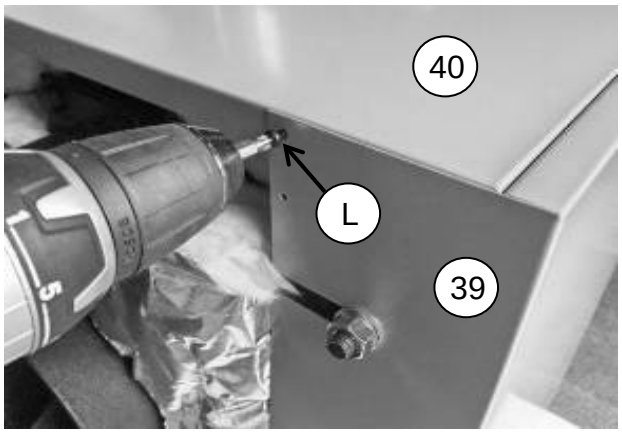




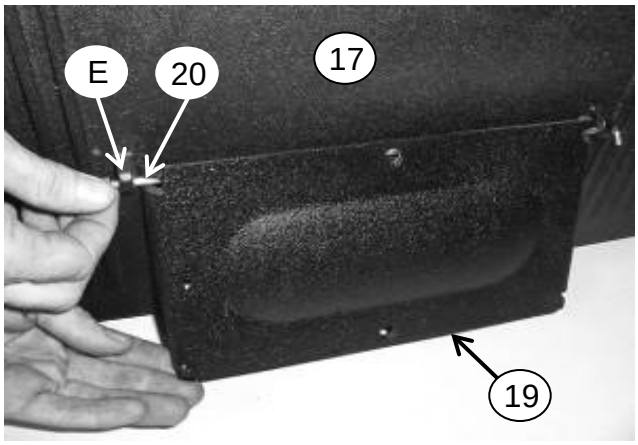
7. Fix the control panel (60) onto top casing (40) as shown in the picture before assembling top casing over the boiler. Then attach sensing bulb of control bulb inside the pocket on the front element of the boiler.

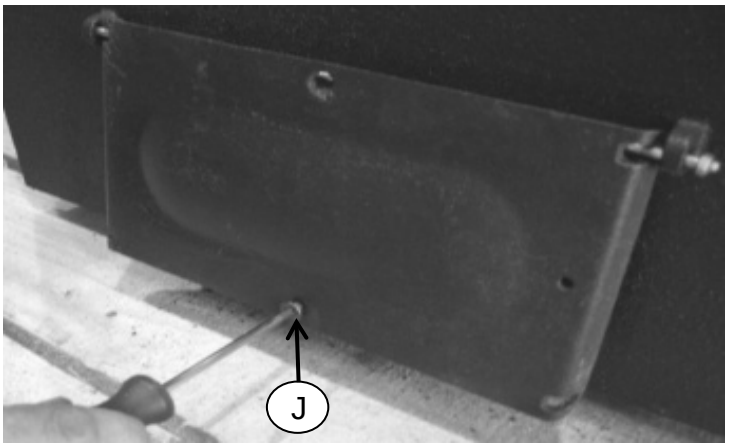


8. If the top is not fitted squarely between two side panels, loose the nuts securing the side panels, and re-adjust the positions of the side panels to match the top panel. Secure the side panels again. Fix the front panel (41) by six pieces of S4.2x9.5 self tapping screws (L) to side and top panels. Fix the rear bend of the top panel to both side panels by the same screws (see following pictures)



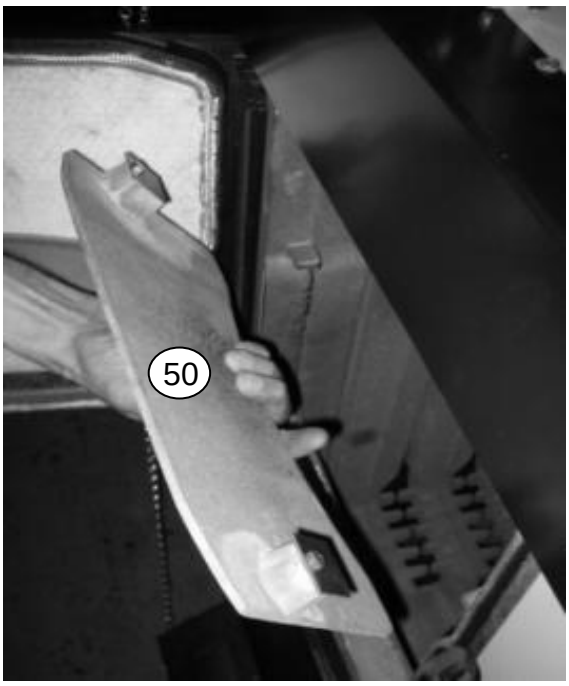
9. Fit primary air damper (19) on the lower front door (17) with the help of primary air damper rod (20), and secure it with a help of M4 nut (E) as shown in the following picture.

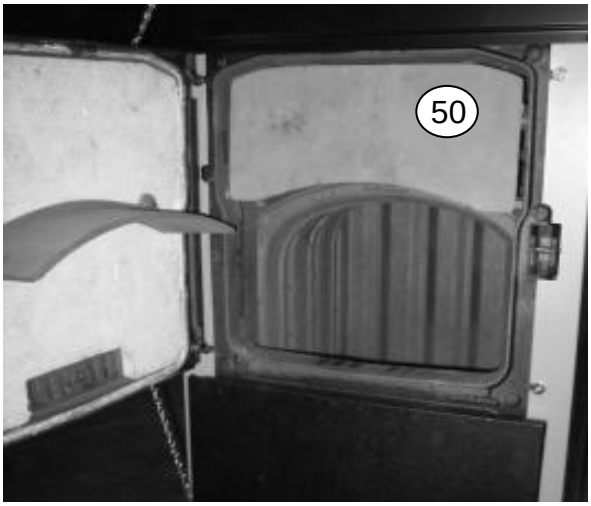




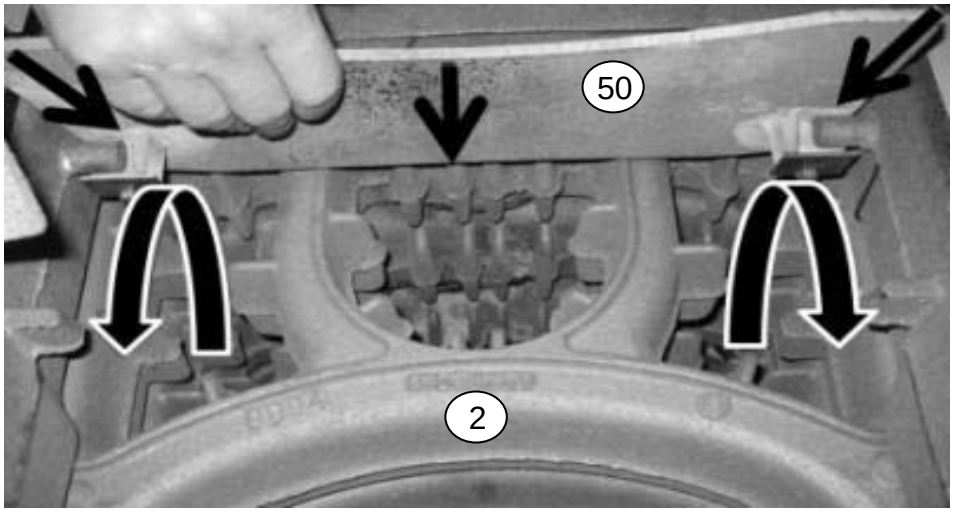
10. Keep close the primary air damper (19) by screwing M6x30 fillester countersunk head bolt (J). Ensure that the damper does not stand open. Otherwise while fan is working air or smoke can come out from this opening.

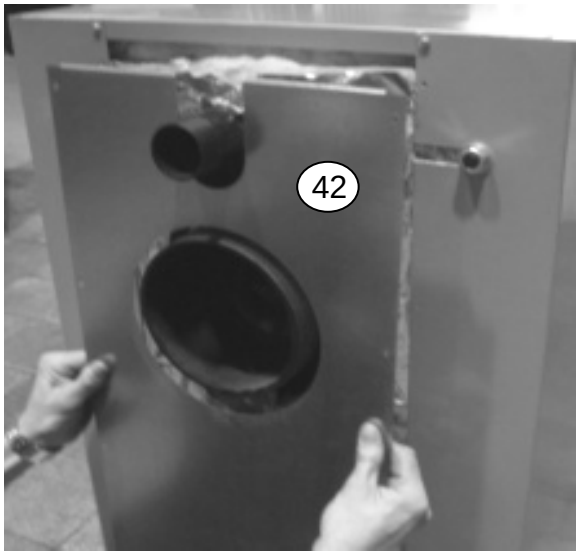
11. During the cleaning of the boiler the dumper (50) is suppose to be removed as shown in the pictures.

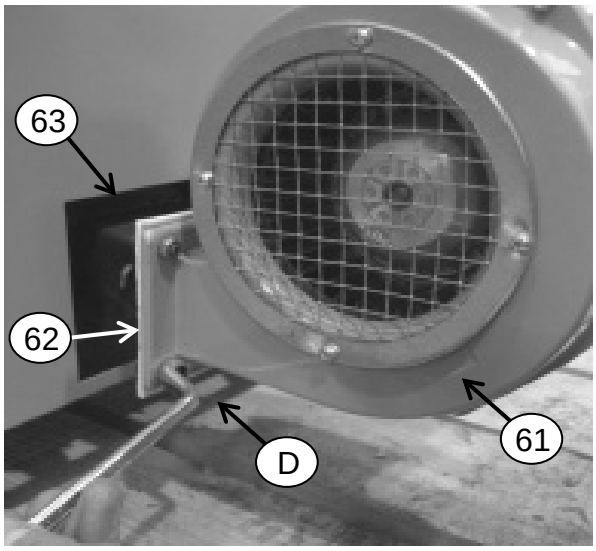




12. by fixing the rear casing follow the instructions:
— Dismount the damper and the rod.
— Remove the damper rod from the upper hole. It does not disturb the flange as it is seen in the picture. There is no need to remove the upper flange.
— Then fit the rear panel as it is seen in the pictures.
— Fit the rod onto the smokehood again.
— Finally fit the damper onto the rod.
please see the following pictures.



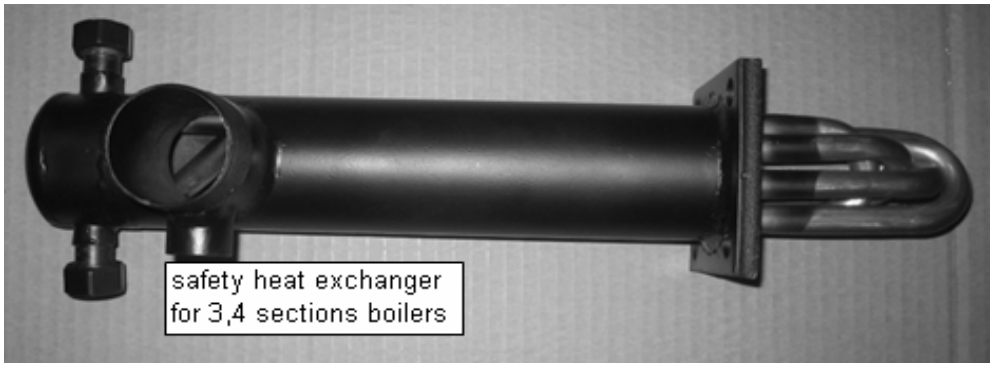


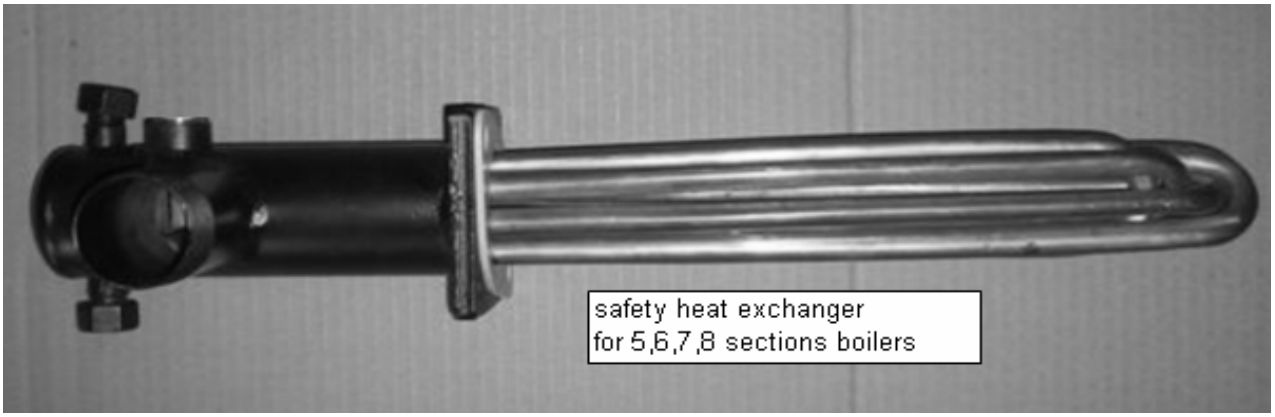


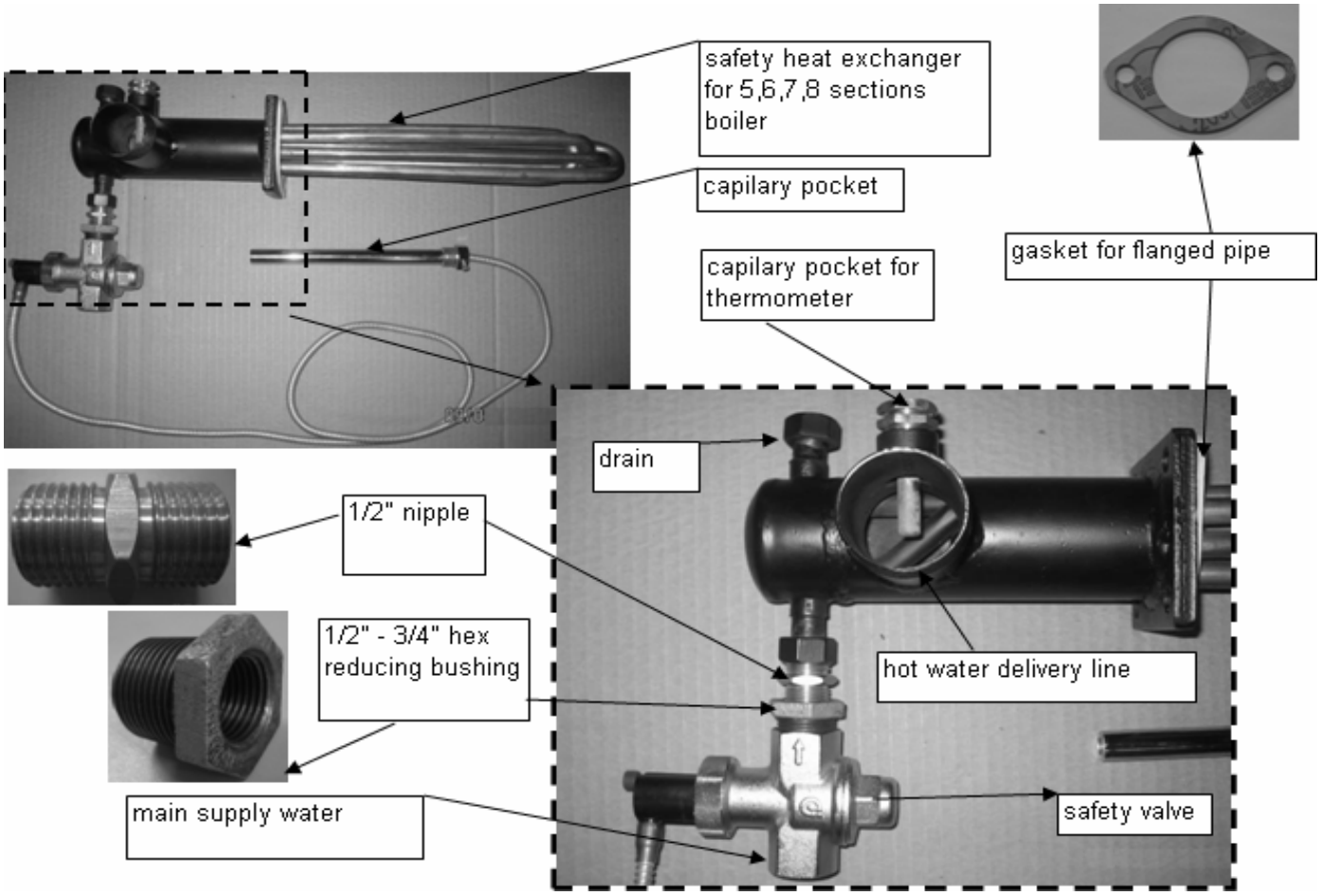
14. finally fix the fan (61) onto fan adaptor (63) by using four pieces M6 nut (D) as shown in the following picture. Place insulation material (62) between fan and adaptor to prevent air leakage.

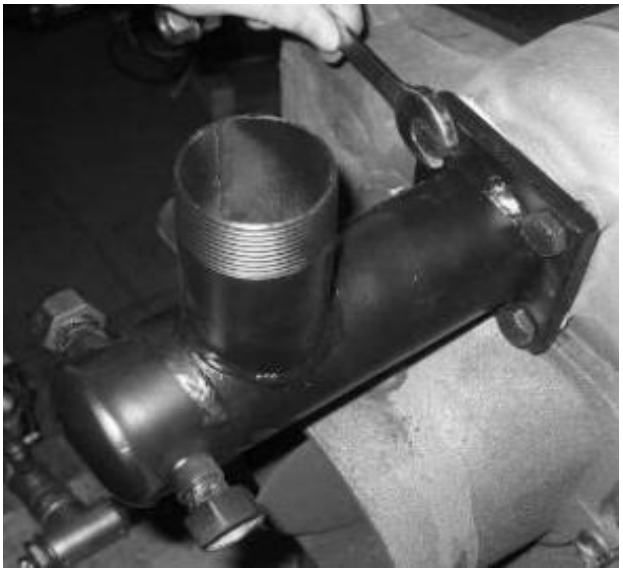
Safety heat exchanger (optional)

The safety heat exchanger is used to save the boiler in case of overheating. In case of electrical cutout, pump defect etc. the boiler water temperature can be overheated.
If the boiler water temperature exceeds 95 ºC, thermostat of the safety valve lets cold sanitary water flows through the serpantine of the safety heat exchanger. Serpantine with cold water circulating inside cools down the boiler water temperature. When the boiler temperature decreases below the safe degree, safety valve shuts the cold sanitary water circulation, and the boiler goes back to normal operation.

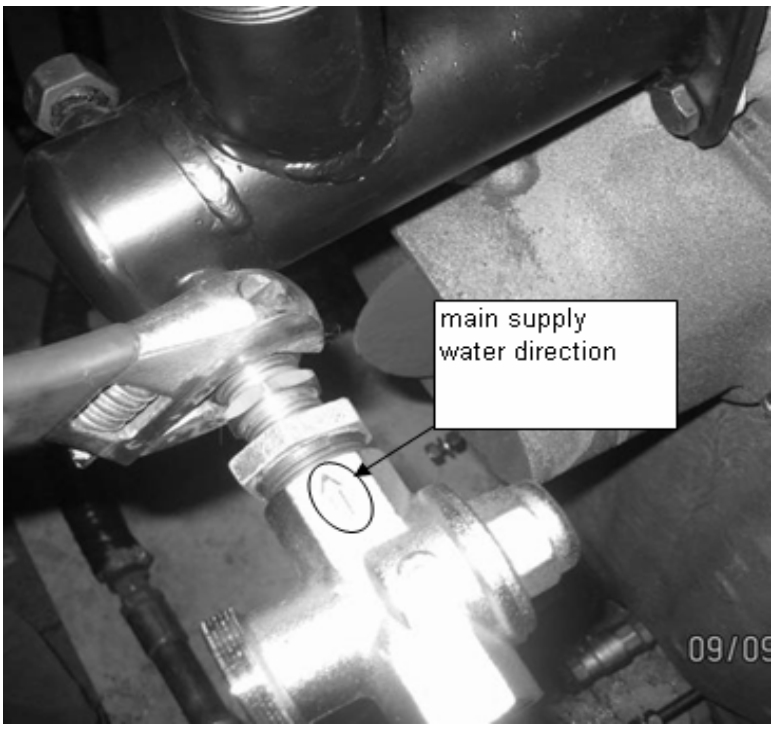






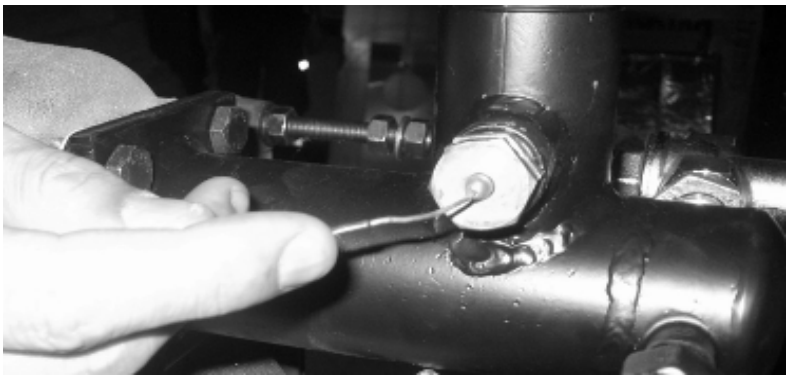


1. Remove the existing outlet stub pipe with flange of the boiler
2. Install the safety heat exchanger to the delivery port on the rear section by four pieces M10X25 bolts. Use gasket supplied with safety heat exchanger to provide sealing.
3. Attach the hot water delivery line to the port on top of the flanged pipe of the safety heat exchanger.



4. Fit the safety valve to the safety heat exchanger with the help of 1/2" nipple and 1/2" - 3/4" hex reducing bushing. Then attach the valve to the main supply water line. Make sure that the direction of the safe valve is right. On the valve there is a arrow **that refers main supply water direction.**

5. Insert the couple thermostat bulb of the safety valve inside the pocket on the front section of the boiler.



6. Remove the bulb of boiler thermometer from the front section, and insert it into the pocket on the flanged pipe of the safety heat exchanger

7. Drain the hot sanitary water outlet of the safety heat exchanger.

CONTROL PANEL

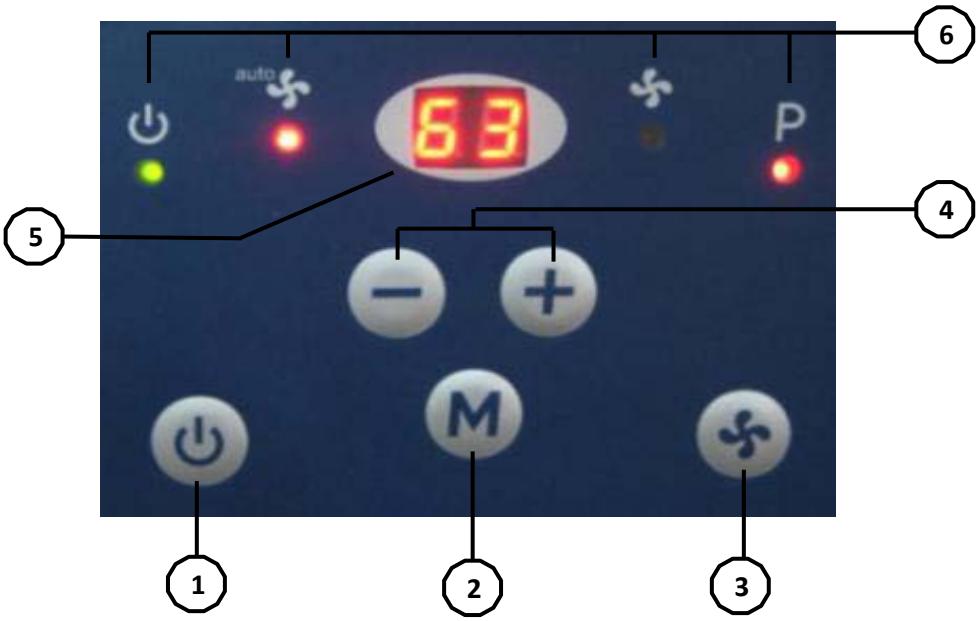
Features of Digital Control Panel:

- ► System water temperature can be followed
- ► Adjustable operating temperature
- ► Smart blower control function
- ► Gives warning when boiler is overheated
- ► Automatic shutdown of blower
- ► All settings are stored in case of electrical cutout
- ► Pump is OFF when the boiler temperature is under 40 °C
- ► Fuse protection

220-230 V 50 Hz 4A

L : PHASE (Brown)
N: NOTR (Blue)
E : EARTH (Yellow-Green)

Note : Do not change Phase and Notr cable connection.



1. On-Off Button
2. Blower Adjustment
3. Warning Leds
4. Display
5. Menu Button
6. Increase/Decrease

On-Off Button (Item1) It turns the controller ON and OFF. In OFF mode, control panel is seen as in followed picture.

Blower Adjustment Button (Item 2)

Blower speed can be changed by touching of button.
When the control panel is opened by On/Off button, blower works in Auto mode.
By pressing the blower adjustment button, operation mode will change respectively as follows :
Au – 0 – 1 – 2 – 3 – 4 – 5 – Au

Au	**:**	Automatic operation
0	**:**	Blower is OFF
1	**:**	Blower works at 1st level
2	**:**	Blower works at 2nd level
3	**:**	Blower works at 3rd level
4	**:**	Blower works at 4th level
5	**:**	Blower works at 5th level

Manual Operation Modes

Display (Item 4)

During normal operation, display shows the boiler temperature.

Warning Leds: (Item 3)

1 - Stand by
2 - Manual blower operation mode
3 - Automatic blower operation mode
4 - Pump operation
5 - Not Available

Operation of Control Panel

Switching the control panel On/Off

Control panel can be switched On/Off by touching

Menu Button Increase/Decrease Buttons Item 5-6)

Boiler temperature set value can be seen by touching " M " button.
Set value is blinking during adjustment. In order to change the value, use "+ / - " buttons.
Boiler temperature value can be set between 40-90 °C with 5 °C steps.
Factory setting is 60 °C.

Adjusting blower speed

Blower starts in Auto mode when control panel is opened by On/Off buton.
If you want to change the speed of blower, use
mode of blower. By pressing the button, operation mode of blower changes respectively :
Au – 0 – 1 – 2 – 3 – 4 – 5 – Au

Automatic Blower Operation mode

In Automatic mode, blower speed is controlled according to the temperature difference between set temperature and current boiler temperature. While current boiler temperature approaches to the set temperature, blower speed is gradually decreased. If the temperature difference is less than 10 °C, blower will run at minimum level. Auto mode enables stable boiler temperature and prevents overshooting.

Automatic Blower Shutdown feature

If the boiler temperature decreases below 40 °C after the first start of pump, control panel waits for a certain time to increase the boiler temperature. If boiler temperature can not increase within 45 minutes, control panel shuts the blower down. In order to re-operate the boiler, please reset the control panel with On/Off button.

Pre-firing checks

Before the first operation of boiler right after installation, the hydraulic circuit must be ready for operation. To fill an open vented circuit, the valve on start level line from expansion tank is opened, and the circuit is filled with main supply water. During filling the system all valves and accessories on the lines must be checked for leakage. Filling is stopped, when water from start level line is observed, closing the valve on this line. Right after that,the hydraulic pressure is marked on screen of the hydrometer. This will make re-filling operations during heating season much easier, just feeding the system with fresh water until the hydraulic pressure on screen reaches the pre-marked value.

Before every firing make sure that;
* Boiler and circuit are filled with water, and the hydraulic pressure is in the required range.
* All valves on the line (except by-pass lines and start leve line) are in open position.
* There is enough draught in chimney.

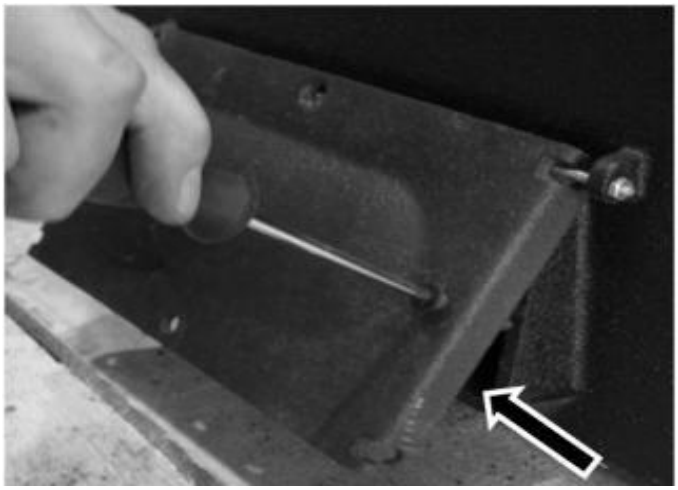
To fill a pressurised circuit, feed the fresh water from main supply line using either the filling/drilling tap connection on the boiler rear sectiion, or the feeding line constructed within the circuit. To purge the air contained in the system, use air relief valves on the hydraulic circuit, on the radiators, and also spring pressure relief valve at boiler hot water outlet.

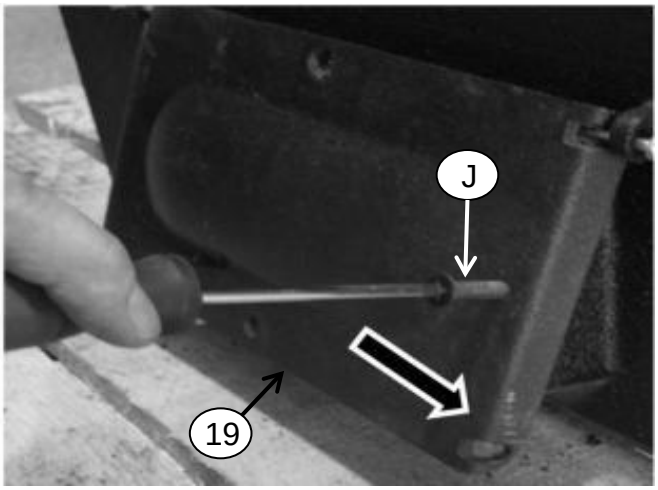
Firing

* Set the Kindling. Place firestarters, crumpled newspaper (3 or 4 sheets balled up fairly tightly) on the grate of the boiler. Place small kindling over the paper or starter. The more dry, small kindling you have - the easier and better the fire will start. Crisscross the kindling so there is plenty of air space in between each piece. Wood that is packed too tight will not burn properly.
* Set larger wood on top of the kindling, and continue to set larger and larger pieces on top until the fuel exceeds the 1/3 level of the filling chamber.
* Ensure that the chimney dampers are open. Then light the newspaper on the bottom
* Desired temperature value is set by digital control panel. The essential combustion air is provided by fan working manually.
* The fire should be well established within approximately 15 minutes, then filling chamber can be loaded completely but check to make sure that the firelighters have not been extinguished.
* After the boiler reach a appropriate condition select auto mode on control panel.
* Keep the fire going Always keep a “flame” on your fire - a smoking or smoldering fire is a cold and inefficient fire and also produces pollutants and creosote (tar in the chimney)

Manual operating

When the boiler reaches a required combustion condition and the chimney gets warm draught will increase on the chimney. If the conditions of boiler room and chimney are appropriate for the boiler operating without fan, it can be deactivated. In order to operate the boiler without fan adjust opening by M6x30 fillester countersunk head bolt (J). as shown in the pictures. It extends combustion period comparatively to fan operating.





Stand-by

*You can slow-down the combustion by

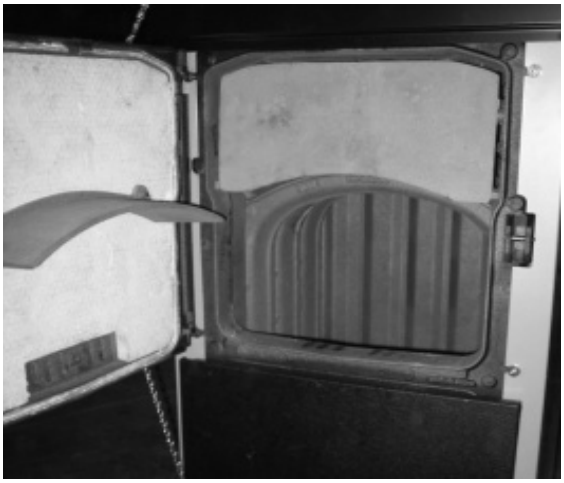
a. Decreasing the set temperature on control panel
b. Selecting manual mode and first level of fan
c. Closing the flue damper fully

⚠ Your control panel switches the pump on and off automatically. That is why, you should keep the control panel switched on, when the boiler temperature is above the cold water temperature or there is fuel firing inside the combustion chamber. Never switch the control panel off unless the fire is completely put off.

⚠ Never let the boiler water temperature reach high values sharply with leaving the pump switched off. In this case, the instant cold water delivey to the very hot boiler may result in cracks on boiler body due to high thermal energy.

Loading the boiler

Solitech Plus is a fully horizontal three pass boiler. There is a cast iron dumper (50) on front section of the boiler to prevent the boiler from smoking when the upper door is opened. It will also obviate the overheating of the upper door.



You can lift this dumper during loading new fuel, but always keep it in its right place to perform an efficient combustion.

Lack of chimney draugt

If there is lack on chimney draught or there is no draught at the chimney (such as badly built, uninsulated, blocked etc) you may face combustion problems (no fire, excessive smoke, condensation due to cold flue gasses). In this case, we strictly recommend you to have your chimney controlled by an expert, and fix any irregularity. Your boiler has been designed for forced draught principle.

Fuel

Fuels must comply with the specifications given in the technical data section. The manufacturer will not be held responsible for the problems due to lack of fuel specifications, use of fuels not suggested for this boiler.

Control of substances hazardous to user health

For the type of material and where used in Solitech Plus boiler refer to the following chart

1. PAINTS:	
General purpose black undercoat	NOT APPLICABLE
High temperature black coating	Sections Boiler body bottom plate
Powder coating	All jackets
2. INSULATION AND SEALS	
Rock-wool insulation board	NOT APPLICABLE
Glass-wool insulation board (aluminum backed)	Sections Smokehood
Fibre-glass rope and tape	Front door Between bottom plate and sections
Ceramic-fibre board	Front door
CFC free polyurethane spray/foam	NOT APPLICABLE
Refractory brick	NOT APPLICABLE
Asbestos products	NOT APPLICABLE
3. SEALANTS	
Red-lead dye	Nipples
Ceramic/mineral compound gasket (Isoplan/Frenzelit)	Flanged stub pipes
Water jointing flax	Tappings on sections
Grey paste jointing compound (Unipak A/S)	Inter section joints
Fire cement	NOT APPLICABLE
Gas jointing compound	NOT APPLICABLE

Specific data sheets are available on request from HEATLINE for those materials but the following material handling and first aid procedures should in all cases be observed.

Paints, sealants, grey paste compound, ceramic-fibre boards

1. These materials contain organic solvents and should be used in a well ventillated area away from naked flames.
2. Do not allow to come into contact with the skin, eyes, inhale or swallow.
3. Use barrier cream or gloves to protect the skin, and goggles to protect the eyes from accidental contact.
4. Small quantities can be removed from clothes or skin with a proprietary paint remover or hand cleaning prdouct.
5. If inhaled, remove sufferer into fresh air, if swallowed clean mouth with and drink fresh water but do not induce vomitting.
6. If in the eye, irrigate the eye with clean water and seek medical attention.

Sharp edges

Care should be taken when handling sheet metal panels that do not have safety or folded edges

Lifting cast iron sections

Care should be taken when lifting cast iron sections as they can weigth up to a few hundred kilograms and HEATLINE can confirm the weight of each individual section if required

Building and servicing the boiler/sections

When building the boiler, the section should always be built on a level base capable of supporting the full weight of the boiler and the sections should always be supported on blocks of wood or props when positioning before final bolting up. An unsupported section should never be left unattended.

Thermal insulation

1. Avoid contact with skin, eyes or inhaling dust.
2. If cutting insulation then do so in a well ventillated area using gloves to protect the hands, goggles to protect the eyes, and a disposable dust mask
3. If a skin reaction or eye irritation is experienced then discontinue working with the material and seek medical advice.

Devices under pressure

1. Avoid contact with the parts of heating system under pressure during operation of boiler. These dangerous parts are such that:
   - Boiler sections
   - Boiler inlet and outlet lines
   - Safety lines
   - Pressure relief devices installed on heating system
2. Never attempt to drain water from heating system when the boiler is being operated
3. Never feed the boiler directly with cold water to cool it down for any reason, when the boiler is hot.
4. In some way the circulation pump can stop working or it may not work properly. In that case:

In open vented system an open expansion tank that is assembled according to instructions in manual prevents overheating and overpressure. Besides activating the By-Pass line that is laid as a condition on both system (open vented and pressured system) protects the system against these type risks.

High temperature surfaces

Avoid contact with parts and surfaces having high temparutares which will be hazardous for human such as:
- Boiler front door
- Fire door on the front section
- Water delivery and return lines (even if isolated), safety lines
- Flue spigot
- Connection between flue outlet and chimney
- Circulator pumps, expansion vessels

Boiler room

1. Ensure that the boiler room has an easy access to outside in case of danger in heating system
2. Do not leave the solid fuels and auxillary substances (chips, paper etc) to ignite the boiler, with the distance less than 800 mm from the boiler
3. Do not cover the fresh air openings of the boiler room, as it is very important for the combustion

Flue gases

1.There could be a little gas release from the front side of the boiler, when the front loading door is opened. Never breathe this gas flow.
2. When adding solid fuel when there is active fire bed inside the combustion chamber, protect your hands and face. If needed wear protective gloves.

Firing fuel

1. Do not take the firing fuel out from the combustion chamber while it is still burning
2. Do not try to put the firing fuel off using water or any other liquids.
3. Do not leave the front doors and fire door open when there is fire inside the combustion chamber
4. To slow down or stop the fire, close air inlets, and flue outlets..
5. Your boiler can only be fired with the solid fuels whose characteristics have been given in Technical data section. Never use any other solid fuel that would be harmfull for boiler section design, any liquid or gaseous fuels.

Fan and Control Panel

1. Before opening the boiler doors the fan must be switched off on control panel. Otherwise it causes injuries and harms to control panel and casing sheets.
2. Never switch off the control panel while the boiler is operating. Because the control panel runs the circulation pump.
3. Control panels should absolutely be protected against external agents such as water, humidity and dust and they should not be mounted under or near the parts such as valves and pipe connections which may leak water.
4. Electrical connection of the devices must be installed on 220 V 50 Hz a grounded wiring.
5. Never close the air inlet of the fan. If it is closed there is break down risk of the motor and the fan can not provide fresh air for the combustion.

Regular maintenance by qualified staff, strictly in accordance with the manufacturers instructions is essential for the efficient operation of system.

Periodic inspections

* Check the water level or pressure either in open vented or pressurised systems. The hydrometer must be marked after first filling of the boiler. So water level can be checked regularly. If the water level or pressure is under the level of static pressure or the system set-up, a water make-up is needed. The make-up water should be softened according the local regulations before feeding into the system to prevent corrosion inside the heating circuit and the boiler.
* Front doors of the boiler should be checked for properly closing. Fibre-glass ropes must be replaced if necessary.
* Check the condition of refractory inside the front section. If it is damaged, you will have higher surface temperatures on front doors. In this case the refractory should be replaced to save energy and prevent further crack.
* Check if there is flue gas leakage from the chimney connections of the boiler, and have it fixed if necessary.
* Check the heat transfer surfaces of cast iron sections. The soot formation will change according to fuel type you use, and the combustion air amount. So if you feel that the outlet water temperature can not reach the usual values with the same conditions, heating surfaces therefore should be cleaned

Cleaning of boiler

Before cleaning the boiler, switch the pump and other electrical appliances in boiler room off.

To clean the boiler:

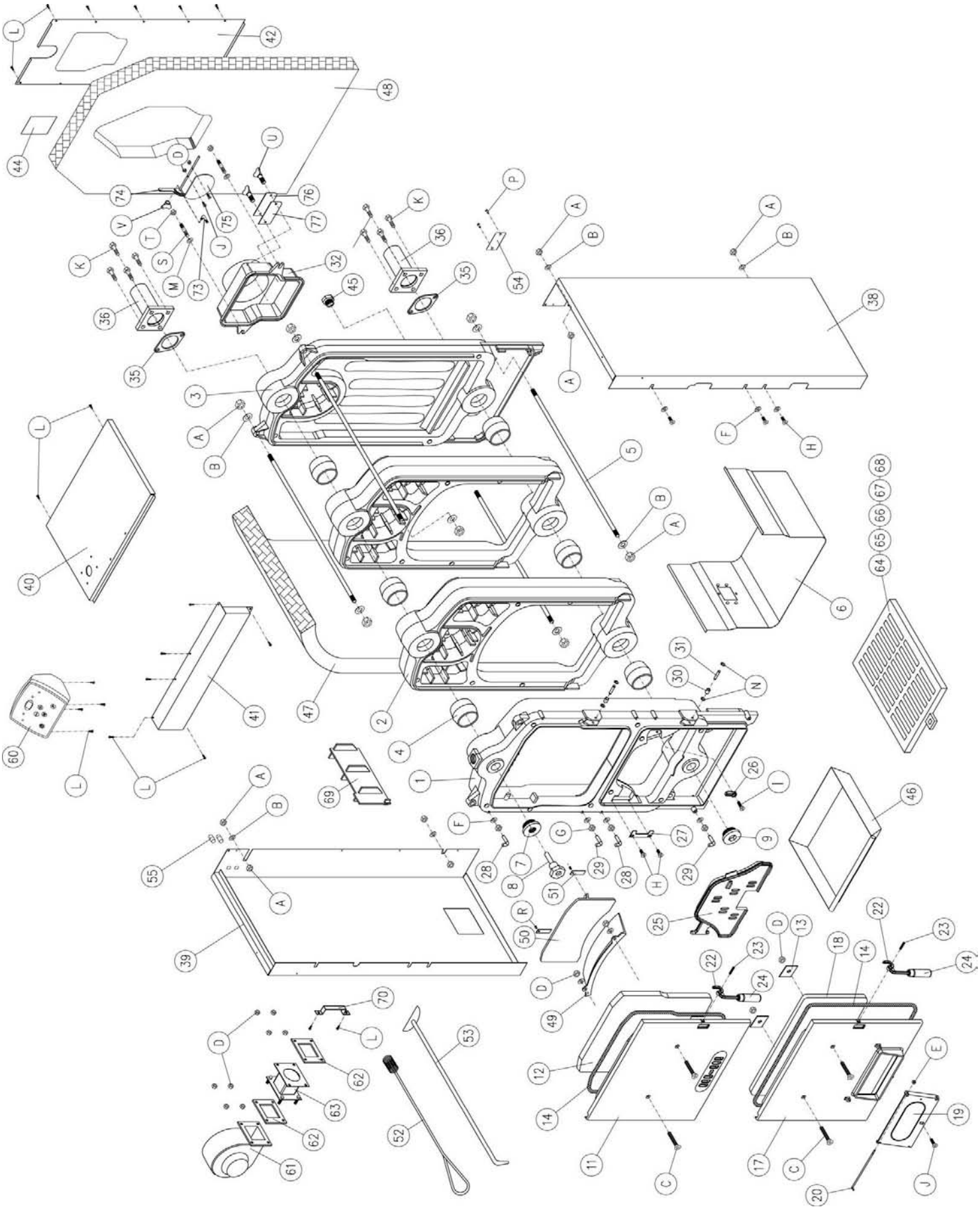
* Clean all heating surfaces using the brush supplied with the boiler.
* Clean the by-pass holes between combustion chamber and second flue gas passages with supplied fuel poker
* Clean the fresh air inlet section at the bottom level of intermediate sections with supplied fuel poker
* Collect all soot deposits inside
* Remove the disposals.

Maintenance

Before each heating season we would recommend you to call for the contracted service agent to check the boiler, heating system, electrical connections, and chimney conditions. Do not attempt to carry any maintenance work without getting help from qualified people.

Safety heat exchanger

*The valves on the sanitary connections of safety heat exchanger must always be kept open.
*Solitech Plus can only be used with origial safety heat exchanger kit which is tested and approved for each boiler model.
*Cold water must never be delivered directly to boiler inlet in order to solve overheating porblems as this will result in serious damage on boiler body. That application will end the warranty of the boiler.
* Make sure that the valves on the drain valves are open.



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